



- Tree Protection Plan -

NORTHWEST INVESTORS, LLC

Willamette Drive NE and Campus Glen Drive NE
Lacey WA 98516

Prepared for: Lacey Community Development

Prepared by: Washington Forestry Consultants, Inc.

Date: April 12, 2021

Introduction and Overview

The project proponent is planning to construct a new gas station and retail center on 1.5 acres in the City of Lacey. The City of Lacey has retained WFCI to:

- Evaluate all existing trees on the site, pursuant to Chapter 14.32 (August, 2006) of the Lacey Tree Protection and Vegetation Preservation Ordinance.
- Make recommendations for trees suitable to be saved in open space or tree tract areas, along with required protection and cultural measures.

Observations

Methodology

WFCI conducted a 100% inventory and evaluation of the entire project site to determine the number, distribution and condition of existing trees. The potential of trees over 4" diameter at breast height (DBH) to be incorporated into the new project was assessed. Many smaller trees were evaluated in the project area as well. The tree evaluation phase used methodology developed by Matheny and Clark (1998)¹ the International Society of Arboriculture.

¹ Nelda Metheny and James R. Clark. Trees and Development: A Technical Guide to Preservation of Trees during Land Development. International Society of Arboriculture, Champaign, IL.

Site Description

The site is mostly flat to gently rolling with a short slope along the northern property line that runs east/west through the parcel. The parcel is bordered by single-family homes to the north, London Loop NE to the east, Campus Glen Drive NE to the south, and Willamette Drive NE to the west. There are no improvements on the property. Access to the parcel will be from Campus Glen Drive NE or London Loop NE.

Soil Depth and Productivity

According to the USDA Web Soil Survey, the one soil type on this site is the Alderwood gravelly sandy loam. The Alderwood gravelly sandy loam is a moderately deep, moderately well-drained soil found on glacial till plains. It is formed in ablation till overlying basal till. A weakly cemented hardpan is at a depth of 20 to 40 inches. Permeability is moderately rapid above the hardpan and very slow in the pan. Available water capacity is low. Effective rooting depth is 20-40 inches. A perched seasonal high-water table is at a depth of 18-36 inches from November to March. The potential for windthrow of trees is moderate under normal conditions. New trees require irrigation for establishment.

In areas where grading brings the hardpan nearer to the surface, the hardpan must be fractured under new trees to provide soil volume for root development and to improve drainage around the tree.



Figure 1. Soil Map of Northwest Investors, LLC site.

Tree Conditions

There are two cover types for the purposes of description.

Type I. – This 0.33 acre cover type is of a dense stand of Douglas-fir (*Pseudotsuga menziesii*) with scattered Pacific madrone (*Arbutus menziesii*), Scouler’s willow (*Salix scouleriana*), red alder (*Alnus rubra*), and Pacific dogwood (*Cornus nuttallii*).

The stocking is uniform with 58 total trees in the type. There are many small (<4 inch DBH) trees in the understory of the stand. Tree condition ranges from ‘Very Poor’ to ‘Good,’ with about 93% of trees (54 healthy, long-term trees) described as being in ‘Fair’ condition or better and potentially suitable for retention.

Table 1. Summary of Trees in Type I.

Species	DBH Range (in)	# of Healthy Trees	# of Unhealthy Trees	Total
Douglas-fir	4 – 25	41	2	43
Pacific Madrone	4 – 12	10	0	10
Scouler’s Willow	4 – 7	1	2	3
Red Alder	7	1	0	1
Pacific Dogwood	10	1	0	1
Total	4 – 25	54	4	58



Photo 1. View of trees in Cover Type I.

Understory vegetation in this type is sparse because of the dense stand. It includes evergreen huckleberry (*Vaccinium ovatum*) and salal (*Gaultheria shallon*).

Type II. – This 1.17 acre cover type covers the remainder of the parcel and includes scattered trees and an open field. The primary species is Douglas-fir with scattered Pacific madrone. There are a total of 17 trees growing in this type. Tree condition ranges from ‘Poor’ to ‘Good,’ with about 88% of trees described as being in ‘Fair’ condition or better.

Table 1. Summary of Trees in Type II.

Species	DBH Range (in)	# of Healthy Trees	# of Unhealthy Trees	Total
Douglas-fir	6 – 16	11	2	13
Pacific Madrone	7 – 9	4	0	4
Total	6 – 16	15	2	17



Photo 2. View of trees in Cover Type II.

Understory vegetation in this type includes Himalayan blackberry (*Rubus armeniacus*), scotch broom (*Cytisus scoparius*), grasses, and broadleaved weeds.

Forest Practices Permit

Trees removed from this parcel will **not** contain more than 5,000 board feet. Therefore, a forest practices permit from the City of Lacey is not required.

Recommendations

Tree Tract

The City of Lacey *Tree and Vegetation Protection and Preservation Ordinance* (Chapter 14.32) requires that a minimum of 5% of the gross project area be set aside as a dedicated tree tract.

The following is a summary of the tree tract calculations:

Total Project Area:	1.50 acres
5% Minimum Requirement for Tree Tract:	0.08 acres
Planned Tree Tract:	0.33 acres
Planned Tree Retention:	52 trees

There is one 0.33-acre tree tract noted on the site plan. The tract is located in the northern portion of the site and has 52 trees in it. There are some gaps in stocking.

The tree tract must be 90% stocked with trees within 15 years. The gaps in the tree tract and on its edges will require replacement trees. Replacement trees should be 1.5 inch caliper or 6-7 ft. tall conifers. Recommended conifer species include incense cedar, ponderosa pine, western white pine, or Austrian pine. Other species must be drought tolerant.

Tree Retention or Replacement on the Lot

The City of Lacey *Tree and Vegetation Protection and Preservation Ordinance* (Chapter 14.32) requires 2 trees to be retained or replaced on the lot per 10,000 ft.² of land for developing commercial or industrial projects. This is in addition to the tree tract and required landscaping.

The following is a summary of tree retention requirements:

Total Project Area:	1.50 acres
Required Tree Tract Area:	<u>0.33 acres</u>
Net Project Acreage:	1.17 acres
Required Tree Retention/Replacement (2 Trees/10,000 ft. ²):	10 trees

The species above would be suitable for replacement, or see Lacey General Tree List for recommended species.

Street Trees

Street trees already occur along the south (red maple) and west (green ash) sides of the project area. New street trees will need to be planted on the east parcel boundary. It is recommended that scarlet oak (*Quercus coccinea*) be planted on 40-45 centers along the east side of the project. This will require approximately 5 new trees.

Hazard Tree Removal

All save trees within reach of targets in the proposed project should have tree risk assessment done by WFCI after staking of the clearing limits, but prior to the logging. Trees that will be hazardous to the new buildings or other targets should be removed during the logging operation.

Tree Protection Requirements

Trees and tree tracts to be saved must be protected during construction by temporary chain-link fencing on driven posts, located at the edge of the critical root zone. The individual critical root zones are 5 feet outside the dripline of all edge trees unless otherwise delineated by WFCI in Attachment 3.

There should be no equipment activity (including rototilling) within the critical root zone. No irrigation lines, trenches, or other utilities should be installed within the critical root zone. If roots are encountered outside the critical root zone, they should be cut cleanly with a saw and covered immediately with moist soil. Noxious vegetation within the critical root zone should be removed by hand. If a proposed save tree must be impacted by grading or fills, then the tree should be re-evaluated by WFCI to determine if the tree can be saved and mitigating measures, or if the tree should be removed.

Timeline for Tree Protection Activity

Stake and heavily flag the clearing limits.

1. Conduct a pre-job conference with WFCI prior to the start of logging. WFCI will mark any potential hazard trees within the tree tract for removal during logging.
2. Complete the logging. Trees to be saved that require pruning should be pruned at this time.
3. Contact WFCI to delineate the tree protection fence locations.
4. Install the tree protection fencing as delineated in the field by WFCI
5. Complete clearing, grading and construct the project.
6. Maintain the tree protection fences throughout the project.

Summary

This project site is currently stocked with small stand of native trees in the northerly portion of the site, with scattered trees in an open grass field.

The site plan proposes a 0.33 acre tree tract in this northerly treed area, but no other tree retention is likely given the tree locations and project design.

The 5% tree tract requirement is exceeded by the 0.33-acre designated tree tract. There are 52 trees in this tract. There are still gaps and open areas on the edges that will require some tree tract replacement trees. We project about 15 trees.


At least 10 other trees will need to be planted on the lot to satisfy the 2 tree/10,000 ft² requirement. These trees are in addition to the tree tract and landscaping requirements.

At least 5 new street trees will need to be planted along the east side of the project. The projected cost of the tree tract replacement trees, trees on lots, and street trees is \$6,000.

There will be additional trees and landscaping required by the landscape ordinance.

Please give us a call if you have any questions.

Respectfully submitted,



Galen M. Wright, ACF, ASCA
ISA Bd. Certified Master Arborist PN-129BU
Certified Forester No. 44
ISA Tree Risk Assessor Qualified
ASCA Tree and Plant Appraisal Qualified



Joshua Sharpes
Professional Forester
ISA Certified Arborist
Municipal Specialist, PN-5939AM

Attachment 1. Aerial Photo of Northwest Investors, LLC Project with Forest Cover Types

(2018 Thurston County GeoData)



— Approximate Project Area Boundary

- - - Forest Type Boundaries

Attachment 3. List of Trees on Northwest Investors, LLC Site.

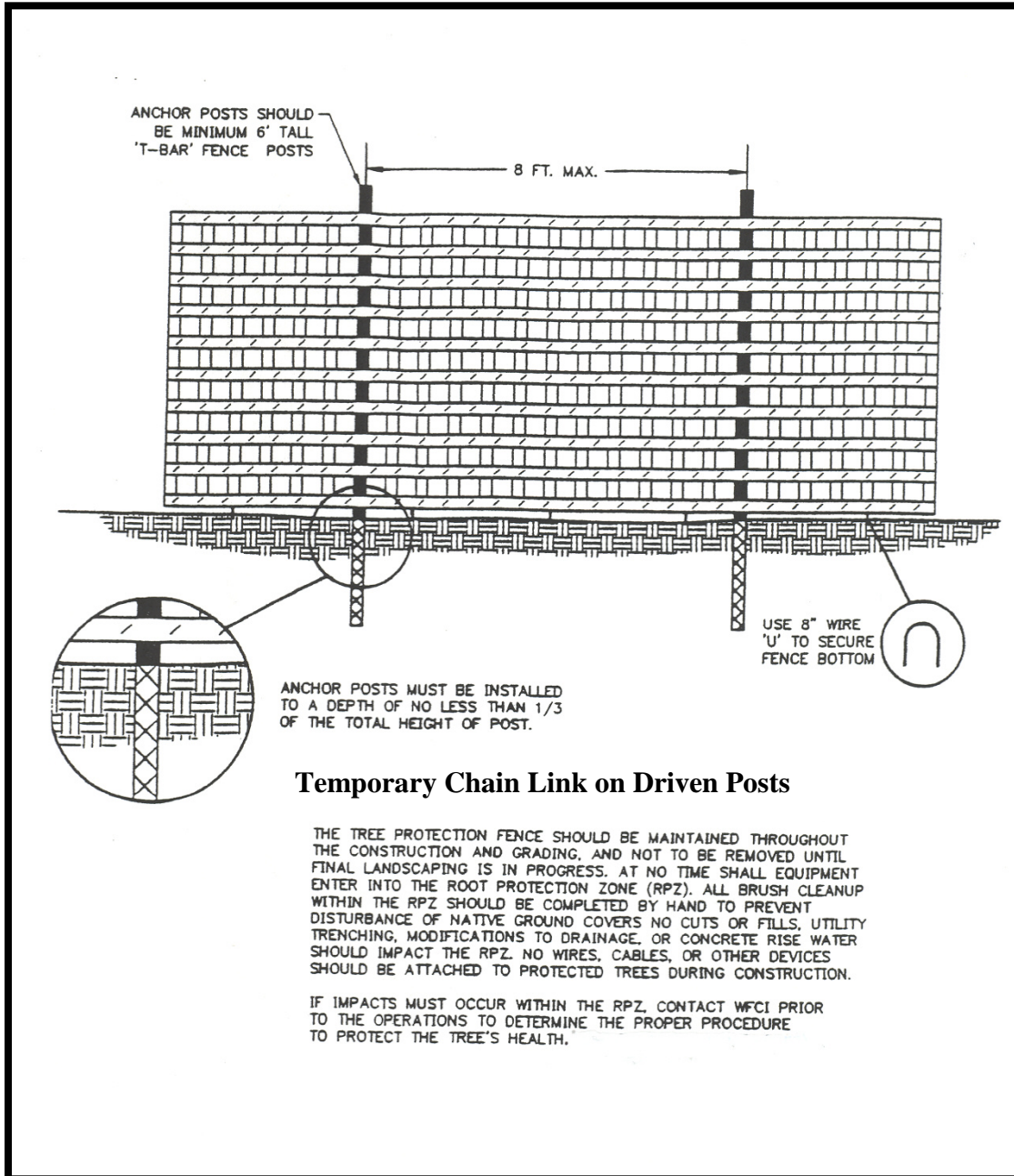
Tree #	Species	DBH (in)	Condition	Min. RPZ (ft.)**	Potential for Retention based only on Tree condition - Yes or No	Project Plan – Save or Remove	Comment
1	Douglas-fir	12	Good		Yes	Remove	
2	Douglas-fir	12	Good		Yes	Remove	
3	Douglas-fir	10	Good		Yes	Remove	
4	Douglas-fir	9	Good		Yes	Remove	
5	Douglas-fir	8	Fair		Yes	Remove	
6	Douglas-fir	16	Poor		No	Remove	dead top
7	Douglas-fir	6	Fair		Yes	Remove	
8	Pacific Madrone	7	Fair		Yes	Remove	
9	Douglas-fir	10	Fair		Yes	Remove	
10	Douglas-fir	10	Fair		Yes	Remove	
11	Douglas-fir	9	Fair		Yes	Remove	
12	Pacific Madrone	9	Fair		Yes	Remove	
13	Douglas-fir	6	Fair		Yes	Remove	
14	Pacific Madrone	9	Fair		Yes	Remove	
15	Douglas-fir	7	Fair		Yes	Remove	
16	Pacific Madrone	8	Fair		Yes	Remove	
17	Douglas-fir	6	Poor		No	Remove	sunscald on stem
18	Pacific Madrone	11	Fair		Yes	Remove	leans out of stand
19	Douglas-fir	7	Fair	6	Yes	Save	
20	Douglas-fir	9	Fair	8	Yes	Save	
21	Douglas-fir	9,10	Fair	12	Yes	Save	
22	Douglas-fir	6	Fair	5	Yes	Save	
23	Douglas-fir	12,18	Fair	19	Yes	Save	
24	Douglas-fir	11	Fair	10	Yes	Save	
25	Pacific Madrone	7	Fair	6	Yes	Save	

Tree #	Species	DBH (in)	Condition	Min. RPZ (ft.)**	Potential for Retention based only on Tree condition - Yes or No	Project Plan – Save or Remove	Comment
26	Douglas-fir	22	Fair	20	Yes	Save	
27	Pacific Madrone	8	Fair	7	Yes	Save	
28	Douglas-fir	7	Fair	6	Yes	Save	
29	Douglas-fir	16	Fair	14	Yes	Save	
30	Pacific Madrone	7	Fair	6	Yes	Save	
31	Douglas-fir	7	Fair	6	Yes	Save	
32	Pacific Madrone	7	Fair	6	Yes	Save	
33	Pacific Madrone	10	Fair		Yes	Remove	leans out of stand
34	Douglas-fir	6	Fair	5	Yes	Save	
35	Pacific Madrone	12	Fair	11	Yes	Save	
36	Douglas-fir	6	Fair	5	Yes	Save	
37	Douglas-fir	23	Fair	21	Yes	Save	
38	Douglas-fir	6	Fair	5	Yes	Save	
39	Douglas-fir	7	Fair	6	Yes	Save	
40	Douglas-fir	6	Fair	5	Yes	Save	
41	Douglas-fir	25	Fair	23	Yes	Save	
42	Douglas-fir	9	Fair	8	Yes	Save	
43	Douglas-fir	7	Fair	6	Yes	Save	
44	Douglas-fir	8	Fair	7	Yes	Save	
45	Douglas-fir	9	Fair	8	Yes	Save	
46	Pacific Madrone	6	Fair	5	Yes	Save	
47	Douglas-fir	6	Fair	5	Yes	Save	
48	Douglas-fir	10	Fair	9	Yes	Save	
49	Douglas-fir	10	Good	9	Yes	Save	
50	Pacific Dogwood	7,7	Fair	9	Yes	Save	
51	Douglas-fir	8	Good	7	Yes	Save	
52	Douglas-fir	17	Fair	15	Yes	Save	

Tree #	Species	DBH (in)	Condition	Min. RPZ (ft.)**	Potential for Retention based only on Tree condition - Yes or No	Project Plan – Save or Remove	Comment
53	Scouler's Willow	6,7	Very Poor		No	Remove	
54	Scouler's Willow	6	Very Poor		No	Remove	
55	Douglas-fir	16	Fair	14	Yes	Save	
56	Douglas-fir	6	Fair	5	Yes	Save	
57	Douglas-fir	6	Fair	5	Yes	Save	
58	Pacific Madrone	8	Fair	7	Yes	Save	
59	Douglas-fir	6	Fair	5	Yes	Save	
60	Douglas-fir	6	Fair	5	Yes	Save	
61	Pacific Madrone	6	Fair	5	Yes	Save	
62	Douglas-fir	10	Poor		No	Remove	
63	Douglas-fir	6	Fair	5	Yes	Save	
64	Douglas-fir	9	Fair	8	Yes	Save	
65	Douglas-fir	6	Fair	5	Yes	Save	
66	Douglas-fir	8	Fair	7	Yes	Save	
67	Douglas-fir	15	Fair	14	Yes	Save	
68	Douglas-fir	7	Fair	6	Yes	Save	
69	Douglas-fir	7	Fair	6	Yes	Save	
70	Douglas-fir	8	Fair	7	Yes	Save	
71	Douglas-fir	9	Poor		No	Remove	poor form
72	Douglas-fir	9	Fair	8	Yes	Save	
73	Douglas-fir	12	Fair	11	Yes	Save	
74	Red Alder	7	Good	6	Yes	Save	
75	Scouler's Willow	7	Fair	6	Yes	Save	

**The Minimum Root Protection Zone is the distance from the tree that the roots can be adversely affected on ONE side of the tree, and still be expected to survive.

Attachment 4. Tree Protection Fence Detail



Attachment 5. Glossary of Forestry and Arboricultural Terminology

DBH: Diameter at Breast Height (measured 4.5 ft. above the ground line on the high side of the tree).

Crown: Portion of a trees stem covered by live foliage.

Crown Position: Position of the crown with respect to other trees in the stand.

Dominant Crown Position: Receives light from above and from the sides.

Codominant Crown Position: Receives light from above and some from the sides.

Intermediate Crown Position: Receives little light from above and none from the sides. Trees tend to be slender with poor live crown ratios.

Suppressed Crown Position: Receives no light from above and none from the sides. Trees tend to be slender with poor live crown ratios.

Live Crown Ratio: Ratio of live foliage on the stem of the tree. Example: A 100' tall tree with 40 feet of live crown would have a 40% live crown ratio. Conifers with less than 30% live crown ratio are generally not considered to be long-term trees in forestry.

Root Protection Zone/Critical Root Zone: A radius from the trees stem of 1 foot for each 1 inch of DBH unless otherwise determined by WFCI. For example, a 7 inch DBH tree would have a critical root zone radius of 7 feet.

Condition Class Descriptions:

CONDITION CLASS	CHARACTERISTICS
Excellent	Single stem; Normal foliage color; No branch dieback; No apparent insect or disease problems; No other apparent problems;
Very Good	Single stem; Normal foliage color; No branch dieback or only a few minor branches died back; No apparent insect or disease problems; No other apparent problems, or they are minor and do not impact the long-term survival of the tree;
Good	Single stem; Normal foliage color; Minor branch dieback; Minor problems such as crown unbalanced; Minor foliage problems; Expected to be a long-term tree;
Fair	Single stem or double stem that is not expected to fail soon; Crown may be slightly thinned due to exposure or reduced vigor; Minor branch dieback and 1 or 2 major branches died back; Minor insect or disease problems; Tree expected to survive;
Poor	Single or Multiple stem tree; Thinning crown; Foliage color yellowed; Inadequate live crown ratio; Major and minor branch dieback; Not a long-term tree or quality tree for development;
Very Poor	Single or Multiple stem tree; Severe thinning crown; Yellow foliage; Major branch dieback; Expected to die within 5 years or so;
Hazard Tree	Dead, dying, diseased, defective; Would be hazardous to new development or if other targets are placed within reach of tree;

Attachment 6. Assumptions and Limiting Conditions

- 1) Any legal description provided to the Washington Forestry Consultants, Inc. is assumed to be correct. Any titles and ownership's to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. Any and all property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
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- 9) Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
- 10) Unless expressed otherwise: 1) information contained in this report covers only those items that were examined and reflects the condition of those items at the time of inspection; and 2) the inspection is limited to visual examination of accessible items without dissection, excavation, probing, or coring. There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the tree or other plant or property in question may not arise in the future.

Note: Even healthy trees can fail under normal or storm conditions. The only way to eliminate all risk is to remove all trees within reach of all targets. Annual monitoring by an ISA Certified Arborist or Certified Forester will reduce the potential of tree failures. It is impossible to predict with certainty that a tree will stand or fail, or the timing of the failure. It is considered an 'Act of God' when a tree fails, unless it is directly felled or pushed over by man's actions.